ealift

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JULY 1975

Salute To Six Seamen

As the entire world now knows, U.S. military forces recaptured the SS Mayaguez after that ship had been illegally detained by Cambodian forces.

What is not as well known is that six Civil Service employees of the U.S. Navy played a key role in actions which led to return of the ship to its owners, Sea-Land Service. The six are members of the crew of MSC's Greenville Victory. All volunteered to accompany military forces to the Mayaguez, and to board the container ship, start her engines and help move her into international waters.

Their role is explained in some detail in this issue of Sealift. I would like to take this opportunity to recognize all six: First Officer Clinton J. Harriman, 2nd Assistant Engineer Michael Saltwick, 3rd Officer Karl Lonsdale, Yeoman-Storekeeper Robert Griffin, Oiler Epifanio Rodriguez and Fireman-Water-Tender Hermino Rivera.

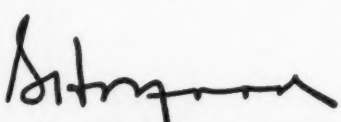
When you volunteered to take part in the rescue of SS Mayaguez, you were well aware you might face heavy risks. The fact that you quickly and freely volunteered illustrates once again that Civil Service mariners employed by Military Sealift Command are part of the Navy's seapower force, just as are the men and women who wear the Navy uniform.

Your actions in volunteering and in carrying out responsibilities you were assigned as part of the rescue force also offer proof that our merchant mariners can be depended upon to meet all responsibilities. They can be relied upon to perform tasks and accept challenges which extend beyond the official scope of their assignments, or the normal call of duty.

In reality, there is no need for additional evidence to support that fact. During World War II, U.S. civilian mariners sailed their ships through hostile waters, helped fight off enemy sea and air attacks, and performed many extraordinary feats to insure that military forces were deployed and supported. Their performance during post-World War II periods of crisis has been equally outstanding.

In the recent evacuation of Americans and South Vietnamese, merchant mariners again demonstrated their professional skills, their courage, their concern for their fellow man, and their willingness to exert the type of effort typical of Department of Defense members who serve the goal of national security.

While I fully expected MSC's Civil Service mariners to respond to the call for volunteers to help rescue the Mayaguez, I am no less impressed by your courage, your competence and your compassion for fellow mariners in distress. I feel that I speak for all members of this command, and the U.S. Navy, when I use this page to salute all six members of the Greenville Victory crew for another job well done. You represented the members of this command in a truly outstanding manner, and your fellow MSC members join with the many who already have expressed their congratulations, and their thanks, for your actions.



Commander, Military Sealift Command

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COVER: U.S. Marines raise the American flag aboard the recaptured merchant vessel SS Mayaguez. Navy officers from the USS Holt are in background. *—U.S. Navy Photo*

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Six volunteers from USNS Greenville Victory boarded the merchant vessel SS Mayaguez to help sail her to safety.

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MSC, Far East Navy Chief Journalist Dan Hansen reports on refueling operations by USNS Mispillion with the Seventh Fleet in the Pacific.

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First in a series on U.S. shipping companies, starting with Pacific-Alaska-Columbia which handles Cool Barge resupply and provided tug and barge assets in Vietnam.

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Six Brave Men

By Howard L. Rosenberg

In a scene reminiscent of swashbuckling Barbary pirates, 48 Marines, 6 Air Force explosive disposal experts and 6 Civil Service crewmen from MSC's USNS Greenville Victory went over the rail of the destroyer escort USS Harold E. Holt onto the captured American vessel SS Mayaguez and raised the American flag.

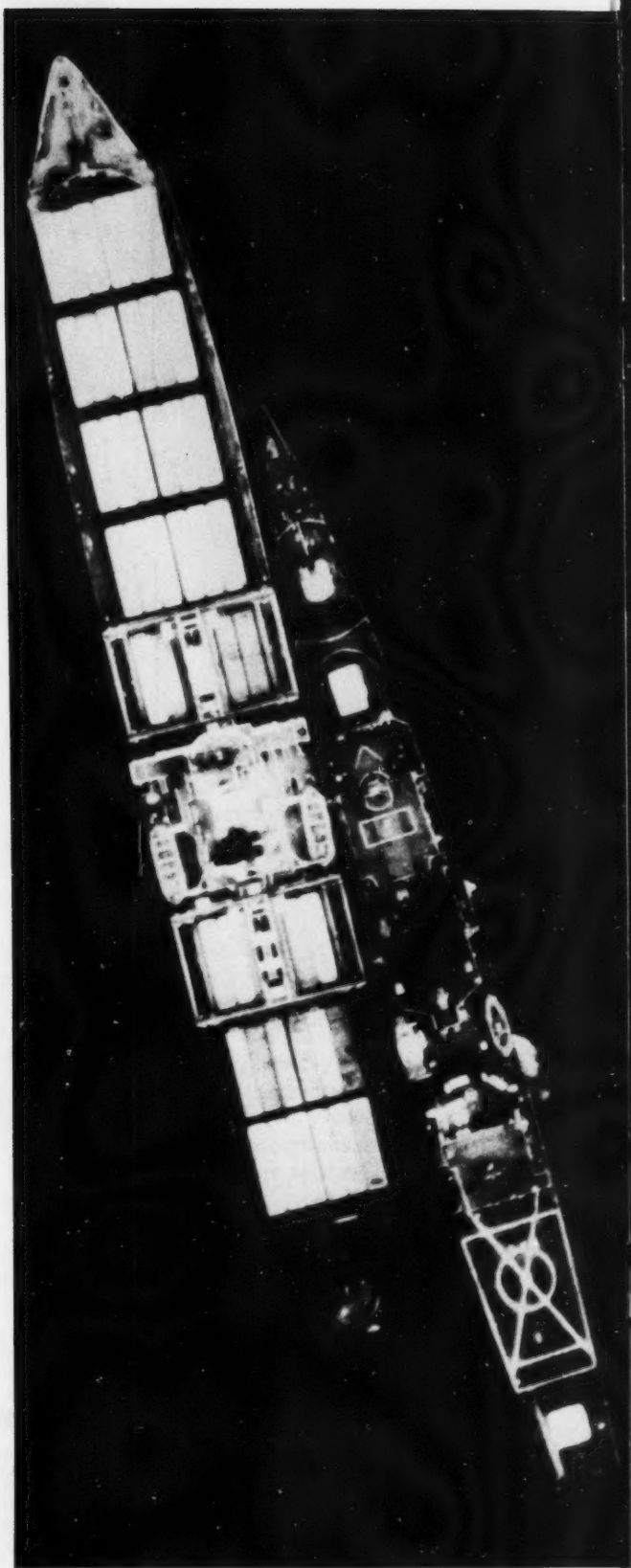
The Marines, armed with M-16 assault rifles to flush out any Cambodian soldiers who might have been aboard, searched the ship and found no one. However, still warm tea and rice in one of the messes indicated someone had recently been aboard the vessel.

The events leading to recapture of Mayaguez, a 504-foot container ship operated by Sea-Land Services, Inc. of Menlo Park, N.J., began late in the afternoon of May 12 in the Gulf of Siam. A radio report from the Mayaguez indicated the ship had been fired upon and boarded by the crew of a Cambodian gunboat. President Gerald R. Ford later that day denounced the seizure as an "act of piracy" and demanded immediate release of the ship.

Mayaguez was enroute from Hong Kong to Sattahip, Thailand on a routine voyage carrying both commercial and general military cargo. She was following a regularly used sea lane when boarded 60 miles from the coast of Cambodia and eight miles from a small island, called Kao Wai, claimed by both Cambodia and Vietnam.

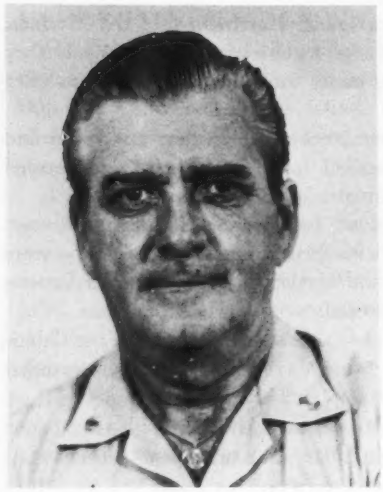
The President's demand for release of the ship and subsequent diplomatic efforts were unsuccessful. After a series of National Security Council meetings at the White House, orders went out at 5:45 p.m. Washington time on May 14 from the Joint Chiefs of Staff launching a series of efforts that resulted in recapture of the ship and 39-man crew about 15½ hours later.

When Mayaguez was seized, there were no U.S. Navy forces in the area. Many of the Seventh Fleet ships had been involved in rescue of thousands of people fleeing



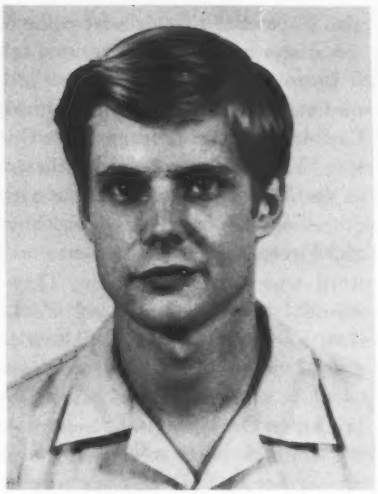
Photographed from an Air Force plane, USS Holt maneuvers alongside Mayaguez near Kach Tang.

–U.S. Navy Photo



Clinton J. Harriman

Michael A. Saltwick



Karl P. Lonsdale

South Vietnam, as were MSC-controlled cargo vessels. Most were in the area of Guam, or off Subic Bay, P.I.

Capt. Charles T. Miller, of Fountain Valley, Calif., was ordered to follow the gunboat into Kompong Som (Sihanoukville) on the mainland. He delayed, telling his captors his radar was out—which it was—and that he could not navigate.

Captain Miller hoped that U.S. forces had picked up the Mayday message he had ordered sent when the gunboat first fired across his ship's bow, and that help was on the way.

But, Miller was ordered to follow the gunboat to Kach Tang, a small island 30 miles off the Cambodian coast. By this time, U.S. Air Force planes were in the air searching for the Mayaguez, then believed to be on its way to a mainland Cambodian port.

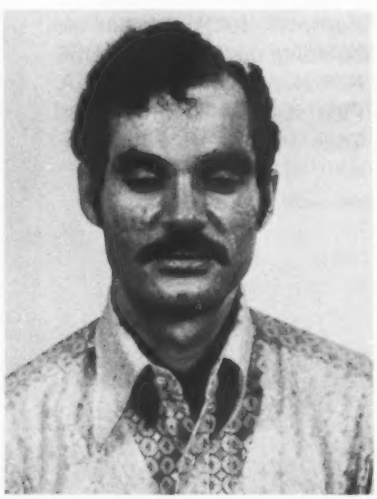
Meanwhile, back in Washington, the Joint Chiefs of Staff had requested that MSC Commander Rear Adm. Sam H. Moore ask for volunteers from MSC ships in Subic Bay to accompany Marines in an attempt to recapture the ship, and to sail it into international waters. Requirement was for five men, three engineers and two deck personnel.

Late in the evening of May 13th, Capt. Raymond Iacobacci, master of USNS Greenville Victory, was unwinding at the Subic Bay Officers' Club with Greenville Victory 1st Officer Clinton J. Harriman. As the men relaxed and talked of the recent evacuation of Vietnam and their next assignment, Capt. Iacobacci was called to the phone.

On the line was Lt. Cmdr. Donald Capie, head of MSC's office in the Philippines. Lieutenant Commander Capie told Captain Iacobacci five volunteers were needed for a special mission concerning the SS Mayaguez. He

Robert A. Griffin

Hermino Rivera



Epifanio Rodriguez

also dispatched a vehicle from the MSC office to pick up the master and first officer and to take them to a briefing.

Learning the nature of the mission, Harriman immediately volunteered and went back to the ship with Captain Iacobacci to locate other Greenville Victory crewmen. Most were in town on liberty so a call was made to the MSC office to provide a car to pick up Yeoman-Storekeeper Robert A. Griffin, Oiler Epifanio Rodriguez and Fireman-water-tender Hermino Rivera, who had left word where they would be. They volunteered for the mission. Third Officer Karl P. Lonsdale and Second 'Asst. Engineer Michael A. Saltwick were standing watch aboard the ship and they too immediately volunteered.

All volunteers were assembled by 11 p.m. and were briefed by the master and Lieutenant Commander Capie. By a minute after midnight, the six men were aboard an Air Force C-141 on their way to Utapao Air Base in Thailand where 1,100 Marines had landed after flights from the Philippines and Okinawa.

The Starlifter aircraft touched down at Utapao at 5 a.m. May 14 and the MSC volunteers were taken to a mess hall crowded with approximately 200 Marines. As they sat down to breakfast, all volunteers were ordered to move to the air strip. Harriman was briefed with the Marine officers and an hour later rejoined the MSC volunteers and informed them they would be boarding helicopters at 10 a.m. Until then, they were to stay at the base gym which had been converted into a temporary barracks. The men stowed their gear and then tried to get a couple hours of rest.

Lift-off was later moved back to mid-afternoon. The Marines showed the MSC Civil Service mariners photos of the Mayaguez and discussed plans to retake the ship if diplomatic efforts failed. Harriman told the Marines, providing none of the machinery was damaged, they could have the ship under way in two to six hours after boarding.

At 3 a.m. on May 16 the "Go" signal was given and the rescue party headed for the runways and boarded the helicopters.

Three helos lifted off from Utapao, the six MSC men in the third along with 20 Marines. In other helos were an Army linguist and six USAF bomb disposal experts who also had volunteered.

While the three helos headed for Kach Tang Island and the Mayaguez which was anchored offshore, other helos carrying Marines left Utapao. A three-pronged attack was planned. Earlier, U.S. Air Force planes had sunk three Cambodian gunboats in an attempt to prevent their taking Mayaguez crewmen to the mainland.

From aerial reconnaissance photos, it appeared that the 39 crewmen might have been taken off the Mayaguez and were being held on Kach Tang Island. The attack was designed to land Marines on the island to win the release of the crew. Simultaneously, the Marines were to overpower Cambodian soldiers believed to be aboard the Mayaguez, allowing the MSC crewmen to sail to safety and Navy aircraft from the carrier USS Coral Sea were to strike military targets in the mainland Kompong Som area.

The USS Holt, which was the first Navy vessel to arrive in the area after the capture of the Mayaguez, sailed for Kach Tang Island to provide a boarding platform for the Marines and volunteers.

The helos approached the Holt and the men clambered down rope ladders to the deck since the CH-53s were too

Just before boarding the SS Mayaguez, USNS Greenville Victory 1st Officer Clinton J. Harriman (left) discusses the boarding operation with USS Holt skipper Cmdr. Robert A. Peterson. At right is 2nd Engr. Michael A. Saltwick.

—U.S. Navy Photo

big for the Holt's helo-pad to handle.

The Holt maneuvered alongside the Mayaguez. Marines then stormed over the side, rifles ready, and searched the ship. No Cambodians were found, but the hot tea and plates of rice indicated the inhabitants had recently deserted their prize.

About 8 a.m., the MSC volunteers boarded the Mayaguez wearing gas masks, since many of the ship's spaces were filled with tear gas dropped by Air Force planes in advance of the boarding. Within five minutes, the MSC men had the emergency diesel generator running and the vessel had power. At 8:20 the Marines raised the American flag.

The MSC volunteers hauled out lines so the Holt could tow the ship to safety and at 10:45 the tow line was made fast, the anchor chain was cut with an acetylene torch by Griffin, and the Holt began her tow while MSC engineers continued to work on the ship's plant.

Meanwhile, on Kach Tang Island, Marines were meeting unexpected resistance. As Holt began towing the Mayaguez, a small fishing boat approached the USS Wilson which was lying off the island to support the amphibious assault. The boat was a Thai fishing vessel captured by the Cambodians a few days earlier. Aboard were a Thai five-man crew and the 39 crewmen of the Mayaguez. The men had been set free by their captors.

When the crewmen of the Mayaguez boarded the Wilson, it was learned that they had indeed been imprisoned on Kach Tang Island, but had been moved earlier in the day to Kompong Som in a small Cambodian gunboat. They had then been moved again to tiny Kach Island off the coast and had been freed there after the attacks on Kach Tang and recapture of the Mayaguez.

By noon all Mayaguez crewmen were back aboard their ship. The MSC volunteers continued to help the crew until 3 p.m. when Captain Miller told them to relax, that he and his men had everything under control.

At 7:30 that night, the MSC volunteers climbed down a Mayaguez accommodation ladder into an Army tug boat and were taken to the MSC office in Sattahip where they reported on the operation and had a good night's rest.

The Mayaguez crewmen had been returned to their ship by the Wilson and the Military Sealift Command volunteers were flown back to Utapao and then to Subic Bay where they were met by their fellow merchant mariners, and received several congratulatory messages.

Secretary of the Navy J. William Middendorf II said, "The valiant action and sacrifice of Navy and Marine Corps personnel in conjunction with superb efforts of our United States Air Force teammates, have in the past few hours resulted in the re-hoisting of the United States flag aboard the merchant ship Mayaguez and the safe return of that ship's crew. The principle of freedom of the seas remains intact. I salute each participant."

Gen. George S. Brown, USAF, chairman of the Joint Chiefs of Staff, sent a similar message and concluded, "I want every individual who participated in this operation to receive my personal congratulations."

Admiral Moore also lauded the men an a message to Captain Iacobacci. He said, "I wish to convey to you and Messrs. Harriman, Lonsdale, Saltwick, Griffin, Rodriguez and Rivera my deeply felt appreciation and admiration."

Flanked by U.S. Marines aboard the re-captured SS Mayaguez are two of the six volunteers from the USNS Greenville Victory, 1st Officer Clinton J. Harriman, without a helmet, and 2nd Asst. Engr. Michael A. Saltwick, just to the right of Harriman.

—U.S. Navy Photo

At Sea With USNS Mispillion

Photos and text by Chief Journalist Dan Hansen

ABOARD THE USNS MISPILLION AT SEA—"When a customer pulls away from my ship, I want him to be completely satisfied. I want him to have all of the services we can provide."

Capt. Gottfried Krull, 49, of Fremont, Calif., talked about his job as master of Military Sealift Command's Navy fleet oiler, USNS Mispillion. The ship, a former U.S. Navy oiler, was turned over to MSC in July of last year and is currently operating in support of the U.S. Seventh Fleet.

MSC received the ship under a Navy program that began three years ago, designed to augment Navy support forces with ships manned by MSC Civil Service mariners. The Mispillion was the fourth Navy oiler to be transferred to MSC for civilian manning.

"I think this is an excellent program and so far it is working very well," Captain Krull said. "There have been a few problems, but you have to expect that when you start something new. So far, we've run into nothing that we couldn't handle."

Mispillion, commissioned in 1945, is a jumboized oiler, having been cut in the middle and a new mid-section added to increase its cargo capacity. The ship currently operates with a 108-man Civil Service crew and a 16-man Navy detachment, compared to a 285-man Navy crew before its turnover. The Navy military detachment mans communications equipment and provides liaison with fleet units.

"We can do the job with fewer people, and overall, we can do it with less cost to the Navy," Captain Krull said. "A Navy-manned ship like Mispillion is considered a war ship, which calls for a weapons department. A bluejacket-manned ship is a self contained unit with its own administrative department. Also, with a military crew, you have to consider dependents, which means housing, commissaries and exchanges."

"These things don't apply to a

Lt. Daniel D. Edwards, officer-in-charge of the military department aboard Mispillion, inspects his men.

Attack carrier USS Midway comes alongside the Mispillion to take on fuel.

civilian crew," he continued. "We are out here to pump fuel, that is our entire job. My men have been trained to handle two and sometimes three different jobs, so we don't need as many people. The only time we really have to come into port is when we need another load of fuel, or when we have maintenance problems we can't handle at sea."

A stocky, blunt-spoken, energetic man, Captain Krull has been sailing in U.S. government ships for 31 years.

"In 1944," he recalled, "I was waiting to join the Army as an air cadet. A couple of friends were sailing with the Army Transport Service at the time, and talked me into taking one trip. I've been with it ever since. I sailed with the Army Transport Service until 1950, after MSC was formed, and I've been with this organization ever since."

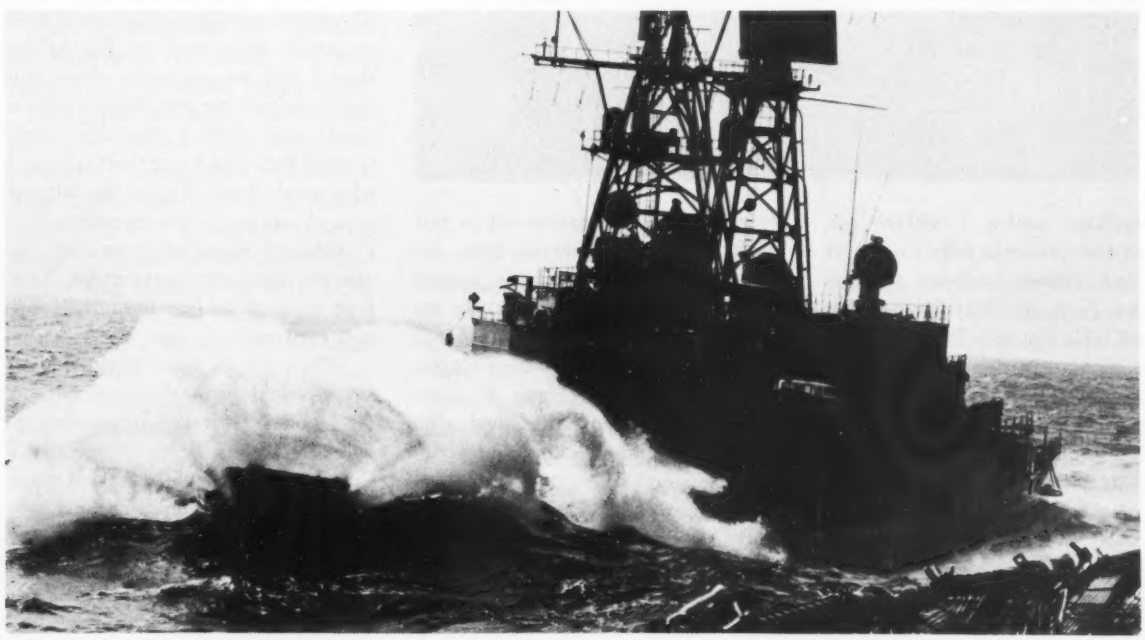
Captain Krull has sailed in nearly every kind of government ship. His experience ranges from oceanographic research ships, to breakbulk cargo vessels, troop transports, and to hospital ships which he sailed in during World War II. His first contact with MSC's Navy fleet support mission came in May 1973 when he spent a month aboard the first MSC oiler, USNS Taluga as an observer. He took command of Taluga on June 15, 1973.

The mechanics of an underway replenishment are complex. The replenishment ship's course is normally governed by the sea and weather to provide better steering. Receiving ships come alongside and maintain a distance of about 60 to 140 feet, with both ships traveling at approximately 12 knots, or about 13 miles per hour.

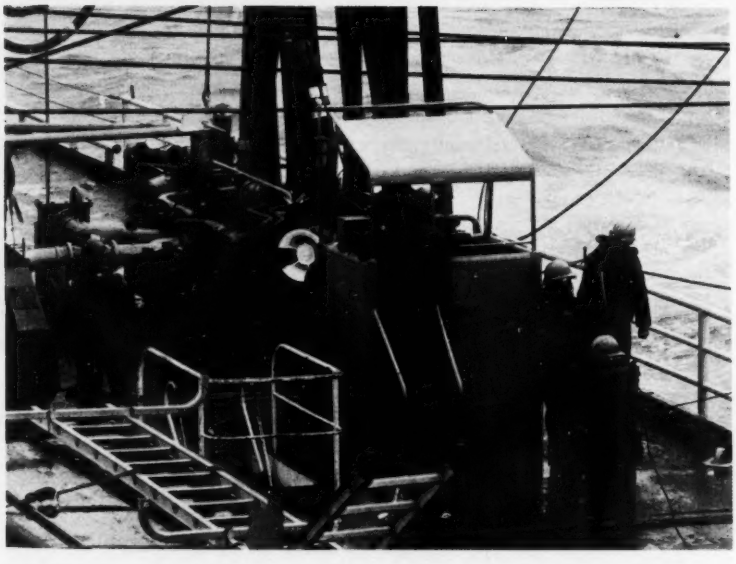
When the ships are in position, special, hand-held, line-throwing guns are used to pass messenger lines between the vessels. Fueling hoses are attached to the messengers and span wires are passed and connected as the refueling operation begins.

Signalman 1st Class Kelly Scott "talks" to another ship via flashing light during replenishment operations.

USS Worden takes a heavy wave as she comes alongside Mispillion for refueling.



Crewmen secure a refueling rig on the Mispillion deck.



Deck men man a refueling station during underway replenishment operations.

Mispillion carries 7,140,000 gallons of fuel products fully loaded. A full load usually includes aviation gasoline, Navy distillate fuel and jet aircraft fuel. The ship has six refueling stations, two to starboard and four to port, each capable of pumping 3,000 gallons a minute.

Under normal circumstances, an underway replenishment is a routine affair in the Navy's at-sea operations, even though it is carried out in fair or foul weather. However, there are instances of mechanical or human failure and instant reaction is required. There are procedures for these emergencies, but there is always the unexpected. The man in command must be prepared to deal with reality, with little chance for second guessing.

"I like the job," Captain Krull said, "and I like the responsibility. The hours are longer because I have to spend more time on the bridge than I did on my other ships, but that's part of the job. Also, I have a good crew aboard this ship, well-trained men who know their jobs and who work hard. That's the biggest part of success in this operation."

Although Mispillion is an oiler, she also provides other services for Navy fleet units under the mini-multi-support concept.

"When we go down to the Indian Ocean, we'll probably have two or three conex (storage) boxes aboard, one of which will be refrigerated," Captain Krull explained. "We'll carry ship's store items and some food sup-

Chief Mate Agusta Horn keeps a close watch on a compass to ensure that the ship is on a steady course during replenishment.

Capt. Gottfried Krull talks to his signalman on the bridge.

plies. This is primarily for Indian Ocean operations. We can tide over the Navy ships we refuel until they reach a port or regular supply ship."

Mispillion arrived in the Western Pacific in February of this year. According to present plans, she will be there indefinitely. Although a unit of Military Sealift Command, Pacific, which provides administrative and engineering support, the ship is under the operational control of Task Force 73, the Seventh Fleet's logistical command. The ship also receives support in the area from Military Sealift Command, Far East, and the MSC office at Subic Bay, P.I.

For 25 years, the Military Sealift Command has been a vital link in the worldwide logistics support chain of the Navy and the Department of Defense. Now, with the advent of the Navy fleet support program, a new dimension has been added to the command's mission. If the performance of Captain Krull and his crew is any indication, that mission is here to stay.

Editor's Note: Agusta Horn, first mate aboard Mispillion, was named master on May 19. Captain Krull is now on leave and will take command of USS Navasota, a Navy fleet oiler to be turned over to MSC for Civil Service manning on August 13. New chief mate of USNS Mispillion is Harry G. McAdams.

Maine Maritime Academy

By Louis R. Granger

Like the uncertainties of the future of the American Merchant Marine, the 34-year-old Maine Maritime Academy is facing the immediate future with some trepidation.

Inflation, state budget restraints, shortage of qualified instructors and fewer sea jobs all add to the collective problem of operating a state maritime institution, such as the one at Castine, Maine.

Retired Rear Adm. Edward A. Rodgers, a 1940 graduate of the U.S. Naval Academy and Maine maritime superintendent since December 1964, said it is getting increasingly difficult to provide effective instruction, operate a large training ship (former USNS Upshur) and find sea-going jobs for the graduates.

"We want to keep up with the shipboard improvements, do things better and push on with training, but shortage of funds forces restraint," he said. "Here at Maine maritime we operate a four-year college as well as a training ship and the ship compounds the problem for us."

The maritime academy act of 1958 authorized financial support for major maintenance of training ships and allowed one such vessel for each state academy. The operation of the ship, however, was left up to the state. Two years ago fuel oil cost $3 a barrel. Today it's about $13 a barrel. "It's costing us a quarter-million dollars a year for oil alone," Admiral Rodgers said. When the ship is not on a cruise it is used as a laboratory and must be maintained alongside the pier, utilizing steam and electric power from shoreside, he said.

Compounding the sharp rise in oil prices are higher electric rates. "Also, we used to wait for the outgoing tide and pump the bilges. We don't do that now, so we must contract for a tank truck and pump into that, which has added to our costs," the superintendent said.

"This all adds up to a tremendous increase in ship operating costs and it's keeping us poor. Operating the ship only for training is damn near impossible."

It costs the academy approximately $3,000 per student for a two-month summer training cruise. This figure alone is more than the $2,400 a year a Maine resident

(Continued on page 14.)

Mariners of the Future

"I want to go to sea. I like it. I paid for it."

Leonard Pettis, 22, regimental commander at Maine Maritime Academy, Castine, could have been speaking for almost the entire senior class.

Like many of the other cadets at the Maine academy, much of Pettis' youth was spent around boat yards and the water. And the lure of the seas, travel and some common sense headed him toward a maritime school.

After high school in his hometown of Marblehead, Mass., Pettis worked at odd jobs for a year. "I got a job in a boatyard. Enjoyed it, but without an education there were not many ways to go."

After a try at a junior college, "I realized I needed more restriction—something to help my self-discipline. Then I started looking at the academy. I was impressed with what I saw and it has turned out the way I wanted."

A school year at the Maine maritime school runs 11 months. First and third classmen take two-month summer cruises and second-year students are enrolled in the cadet training program where they work on commercial U.S. flag vessels for a summer.

This leaves little time for cadets to earn money for tuition and room and board which comes to about $2,400 a year for Maine residents and $3,300 for non-residents.

Of the 80 cadets who graduated last spring, 50 had outstanding loans. Pettis has borrowed $14,000 in low-interest educational opportunity loans.

Last summer he sailed aboard the SS Texaco Georgia, a Texaco Oil Co. tanker. "It was great," he said adding that he would prefer a tanker job when he graduates. He will get his third assistant engineer's license by graduation—if he passes the Coast Guard examination.

Upon successful completion of academy and Coast Guard requirements, students will become either third assistant engineers or third mates. Many are looking forward to joining oil company fleets, influenced partly because of a tanker training program using a student-built, 26-foot scale model of the 80,000-deadweight-ton tanker Joseph D. Potts.

The tanker simulator was completed in 1973 with provisions for loading and discharging liquid cargo under simulated shipboard conditions. Floating in a wet basin, the fiberglass hull is electrically connected to control room support equipment such as an ullage display board, a cargo and ballast pump control panel, a deck and pump room valve control panel and console, with calculated inputs into the system from a computer.

Jeffrey W. Monroe, 21, of Fairview, N.J., was one of the students who helped build the tanker simula-

tor. "I developed an interest in tankers working in the training program."

His interest in becoming a merchant mariner, however, came from his father. "He was a mariner, sailed mostly on passenger freighters, and was on the SS Morro Castle when she burned off the New Jersey coast on Sept. 8, 1934. "He was an AB (able-bodied seaman) at the time. He spent 15 to 18 years at sea. He went to sea the second day after high school graduation and went ashore for the same reason a lot of people do. He got married."

Although tanker jobs are hard to find today, Maine maritime cadets have faith that the tanker segment of the merchant marine will again flourish. Monroe noted that the maritime industry is a fluctuating one but, "We here have faith that tanker jobs will come back. After what this country has gone through, World War II, Korea, Vietnam, the nation has got to realize the necessity of a merchant marine."

Monroe believes that specialization is the future for the maritime industry. "Our saving grace is our technology and that requires highly specialized people. You're going to be a tankerman, a LASH (lighter aboard ship) man, passenger ship man. The future is specialization."

Richard D. Wesley, 21, of Newport, Maine, also has chosen tankers for a beginning career. Studying for the deck department, Wesley last summer shipped on a Texaco tanker. "Texaco has a 20-year retirement plan and I'd at least like to get 20 in, but you never know."

Like the others, Wesley believes better times are ahead for the U.S. Merchant Marine. "The oil preference bill could have really helped us," he said. "I don't think the merchant marine will get any worse than it is. Things are coming up."

Wesley, however, is one of the few cadets who initially plan to make a 20-year career of sailing. Many of the other midshipmen interviewed hesitate to commit themselves to a full career at sea.

David E. Thibeau, 22, of South Portland, Maine, regimental adjutant at Marine maritime, noted that sailing "is a way of life, but many people don't like the life. Some of our graduates are going on tugs. You have two weeks on and two off, and that's not bad for the guys who don't want to ship. I plan to ship as third assistant engineer and stay until I get a chief's license and maybe stay a couple of more years, and then see what happens."

Another engineering senior, Henry I. Martin, 21, of Kittery, Maine, said, "I don't know if I'll make a career of it, but I hope to ship, make a little money and come ashore in about five years."

Martin believes that tanker berths will become available in the future, especially along the West Coast when the Alaska pipeline is completed. "Insurance, high maintenance costs and inflation are beating the American merchant marine to death, but I have faith in the future of the industry. One reason is that I'm part of it and another is because we must have it."

"We're an island nation and we need to be more self-sufficient. We've become more reliant on imports and our own merchant marine should do the job of bringing the necessary goods to this country."

Jeffrey M. Potter, 20, of Newport, R.I., believes there will be a revival of the merchant marine when the nation's economy improves. "I'd like to think that as America goes so goes the American merchant marine. When America thrived the merchant marine thrived. But we're second rate now."

In the deck curriculum, Potter sailed last year on a breakbulk ship for Moore-McCormack Lines. "Right now I'd say I'd like to make sailing a lifetime career. Moore-McCormack was great, but it depends on the company I go with and who my shipmates are."

Sophomore Steven Stilphen, 20, also of South Portland, is an engineering student who like many of the others does not plan to make sailing a career. "I'm going to ship for about five years. It will be a good foundation for the future and I'll make enough money to look around for something related to maritime. Maybe I'll go back to school and study marine architecture."

Stilphen may be typical of most academy students — some nautical background, some small-boat sailing and simply a love of hanging around boats and the water.

"I've been near the sea all my life. When I was 12 or 13 I worked in a yacht yard helping people get their boats off trailers and into the water. It's funny, a lot of people don't know how to do that. I also painted lobster boats. You can always make some money around the water."

Jeffrey W. Monroe adjusts wiring of tanker simulator he helped build.

pays for tuition, room and board and miscellaneous fees. Out-of-state cadets pay $900 more for tuition, or $3,300 a year.

Aboard this year's cruise were 306 students plus 49 officers and 17 food service personnel. The 534-foot-long State of Maine, built as a luxury passenger-cargo vessel for American President Lines but converted to a military troop transport before she was launched in 1952, left her home port of Castine on May 4, three days after her scheduled departure due to a breakdown in feed water pumps. She had a similar problem last year and that cruise was also delayed.

Her age and the fact that she remains idle for 10 months a year contributes to maintenance problems. "However, this is a training ship and a training cruise and such problems are essential to good practical training," Admiral Rodgers said.

Most, perhaps all, state maritime academy ships have been retired from military service. The sister ship to State of Maine is the former USNS Barrett, now TV Empire State, the training vessel for the State University of New York Maritime College.

"The ships are old and there are no replacements," said Admiral Rodgers. Cargo ships, he noted, are not suitable because they lack the necessary accommodations and converting cargo space into living areas would be too expensive.

"There has been a proposal to share one ship with two or three academies, but this would not be a savings for us. We would still have to pay salaries and buy the fuel," he said. "Furthermore, without our own training ship to use as a shoreside lab the Coast Guard would require twice as much sea time, which would then increase our present training costs. In order for this system to work it would be necessary for the federal government to assume operating costs and then the academy could maintain a dead ship alongside as a lab."

USNS Upshur was operated as a troop transport by Military Sealift Command until April 1973 when she was turned over to the Maine Maritime Academy. Academy midshipmen departed on the newly named State of Maine on a two-month training cruise to South America and the Caribbean. Last year she visited Leningrad, Helsinki, Antwerp and Glasgow. It marked the first time that a training ship of any kind from the United States had visited a Russian port.

The State of Maine "should last a good 10 years more," the admiral predicted. "But then what? The Maritime Administration does not have the answer. Without a ship how do we get the people trained? There are no suitable ships under the U.S. flag which could be made available as replacements. Furthermore, there is not enough berth space for cadets aboard operating ships of our merchant fleet to meet our training needs when the academy training ships are phased out."

Maine maritime students take two-month cruises at the end of their first and third years. Following their sophomore year the academy attempts to get them summer jobs on commercial vessels. This cadet training program began in the late 1960s and has been successful. This year, however, seven of the 119 sophomores qualified were not placed.

Although the shortage of jobs is hurting maritime academy graduates now, Admiral Rodgers noted that a Maritime Administration study predicts a shortage of ship officers in the late 1970s. Fifty-five per cent of the officers are now 40 years or older so retirements will open the job market, and the future availability of officer's jobs is good, he said.

The 1970 Merchant Marine Act is getting new ships built, he said. The vigorous efforts to get shippers to use U.S. flag ships, operating schedules which provide longer vacation periods and the cargo preference act "which I expect will be signed the next time it comes around," all should provide more jobs in the future, Admiral Rodgers said.

Although getting enough money to operate the training ship and the academy is a major consideration, Admiral Rodgers said "Finding the right people is one of the more serious problems. They must be willing to move to Maine and accept the salary ($9,000 to about $13,000) we pay."

Maine Maritime Academy, he said, "can no longer emphasize only the traditional maritime subjects needed for the initial merchant marine officers license. Technol-

TV State of Maine just prior to her 1975 summer cruise.

ogy alone demands you put emphasis on specialized ships, systems and operations. Graduates must be prepared to serve aboard a wide variety of ships such as tankers, chemical carriers, LNG (liquefied natural gas) ships, ore carriers and container ships, including the LASH and Seabee."

Other factors such as state standards, increasing student costs and an erratic job market make it necessary to include other marine related courses in the academy curriculum. Maine maritime offers more than 30 elective courses so that students can complete a minors program in such areas as marine industrial management, naval architecture, ocean engineering, oceanography and business administration.

If the academy has found itself in an economic squeeze, the students are in the same boat. Marine maritime students attend school 11 months a year, two months more than regular university students. This leaves academy students little time for summer work to earn money for the next year.

A questionnaire given 80 seniors this year elicited 62 responses. Fifty had outstanding loans averaging $6,000 each. Admiral Rodgers said those from lower income families are not applying because of the costs. It takes at least $2,000 to meet first semester requirements.

But, for several reasons, more students are applying to state maritime academies than ever before "and this presents a very bright spot for us," the admiral said.

One reason seems to be that the present generation is more job oriented. The academies offer a four-year degree. Job opportunities are relatively good and well paying. Also, most maritime academies have modern campuses due to recent capital building programs. Finally, the students do not seem to have the anti-military feelings of a few years ago.

Ten years ago the Maine academy began a major $8 million-plus capital improvement program and since then has added a dining hall, student union, a large field house and a physical education complex complete with swimming pool. Also built were indoor track, tennis and basketball courts, wrestling and weight-lifting rooms, handball and squash courts. Just completed is a 611-bed dormitory complex including a dispensary, book and clothing store, gift shop, lounge and conference rooms, and a rifle and pistol range.

Rear Adm. Edward A. Rodgers (USN Ret.), academy superintendent, discusses operating problems.

An engineering complex on the Castine waterfront provides an auxiliary engineering lab, a machine shop, electrical lab, classrooms and office spaces. Under construction is a science building which when completed will house electronics and physics labs, electronic navigation lab and additional classroom and office spaces. Other spaces are being converted into oceanography and chemistry labs.

Completing the master campus development plan will be a new library, tentatively delayed because of the recession and state budget problems.

The strongest feature of the state maritime academy system is that the students actually operate and maintain the ship supervised by only a few officers, Admiral Rodgers said. Third-year students during the annual cruise are involved in every aspect of the ship's operation from the bridge to the laundry. They rotate between watches, maintenance and training. By the time they complete six months sea time in addition to their four years of helping to maintain the ship alongside, they are prepared to perform all duties of a third mate or third assistant engineer.

Admiral Rodgers, other Maine maritime officials as well as students who visited Leningrad last year were impressed with the Soviet maritime training ships.

"They have a system that works and makes sense," he said. Soviet training vessels serve as both training ships and cargo carriers. Admiral Rodgers suggested to his Russian host that the Soviet training ship at Leningrad visit Maine. The Russian captain said, "first we must talk about trade."

Soviet training ships must pay their way by carrying cargo. "Unfortunately," said the admiral, "such a system would be opposed by shipping companies and unions in this country."

"Perhaps the need to be more concerned over costs and conservation should cause us to reexamine the way we do things."

Coastal Flooding

By Cynthia J. Brodnax

For more than 300 years of recorded history severe tidal floods have hit areas along the North American coastline, wreaking havoc in low lying communities and changing the face of both geography and history.

Scientists have long conducted intensive hurricane and storm surge research, yet until 1974 there was no scientific method of predicting tidal floods.

Fergus J. Wood, research associate in the office of the director, National Ocean Survey (NOS) of the National Oceanic and Atmospheric Administration (NOAA), now has developed a theory which may allow valid prediction of tidal flooding potential. His theory links astronomy, oceanography, and meteorology with the cause.

Twice each month, at new and full moon, the earth, moon and sun come into a straight line and raise tides higher than usual. These are called spring tides. Once each month the moon also reaches its closest approach to the earth, a position called perigee. Ordinarily these two events do not occur together, but on the occasions when they coincide, they produce even higher tides called perigean spring tides.

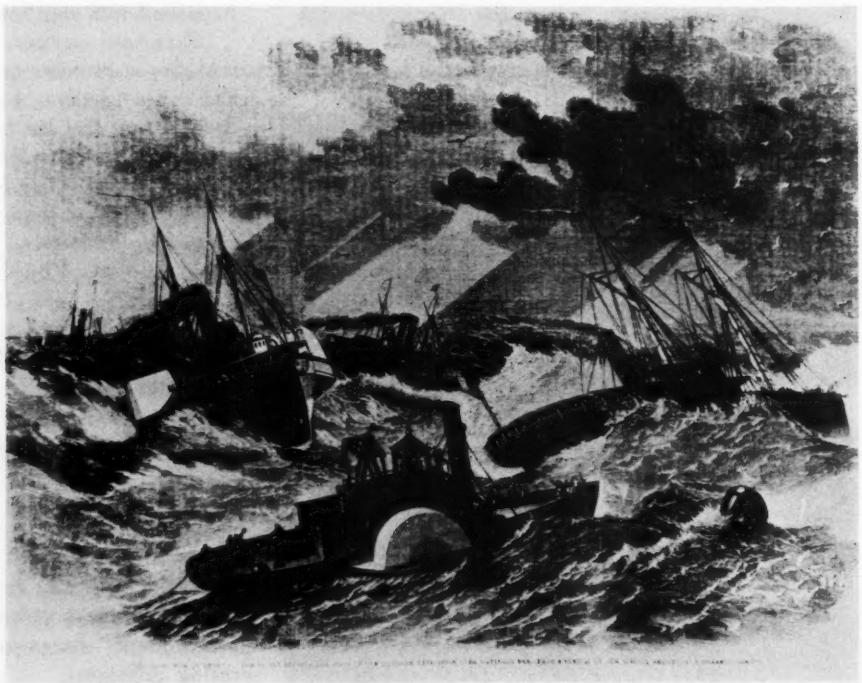
Far less frequently, the perigee distance of the moon is an especially close one, adding to the moon's influence on tides. When a perigean spring tide produced by these special astronomical circumstances also coincides with a strong, persistent onshore wind—one almost continually blowing from sea to land—a major coastal flood is likely, according to the NOAA scientist's theory.

Wood began his investigations in May 1973. He developed a computerized table with the aid of the Naval Observatory that lists every date from 1600 to 1999 on which a "perigee-syzygy," the astronomical alignment of three celestial bodies that is responsible for perigean spring tides, has occurred or will occur. The table also shows when tidal conditions are right for coastal flooding.

Matching these dates with newspaper and historical accounts of major coastal flooding and with more than 100 years of tide and weather records, Wood found that almost every case of severe tide-related coastal flooding in the non-hurricane season occurred in connection with perigean spring tides and strong, persistent onshore winds. This tended to support his theory.

The best measure of such a theory, obviously, is the accuracy of predictions. By August 1973 Wood had progressed sufficiently in his studies to be able to predict that, given strong, persistent, onshore winds, a coastal flood could hit the lowland areas of the northeastern or western coasts of the United States on Jan. 8, 1974.

As a result of Wood's prediction, covered in press, radio and television reports on Dec. 25, 26 and 27, 1973, public works personnel in southern California piled thousands of sandbags along the coast and averted what could



Stormy entry of new Hatteras Inlet by Burnside Expedition on Jan. 22, 1862. From London Illustrated News, Feb. 2, 1862.
—Courtesy, The Mariners Museum

have been a major disaster. Onshore winds and the perigean spring tides produced surging waters that overran seawalls and knocked down sandbag barriers right on schedule—on January 8.

Despite the precautions, there was severe coastal erosion and damage to structures at Malibu, Newport, Laguna, Capistrano, and Mission beaches, and at San Clemente. The stage of this perigean spring tide was particularly high because, just before midnight (EST) on January 7, the moon was only 217,867 miles from the earth's surface at the latitude of Atlantic City, N.J., a lunar proximity that has occurred only 20 times in the past 300 years. (The moon is normally about 238,857 miles from earth.) According to Wood's long-range tidal investigation, the moon will again be that close to the earth on Dec. 2, 1990, and on Jan. 19, 1992.

Severe coastal flooding did not occur on the northeast coast of the United States on January 8 and other dates of perigean spring tides in 1974 because the effect of the heightened tides was nullified by high atmospheric pressure, and offshore rather than onshore winds. These same circumstances have limited occurrences of coastal flooding.

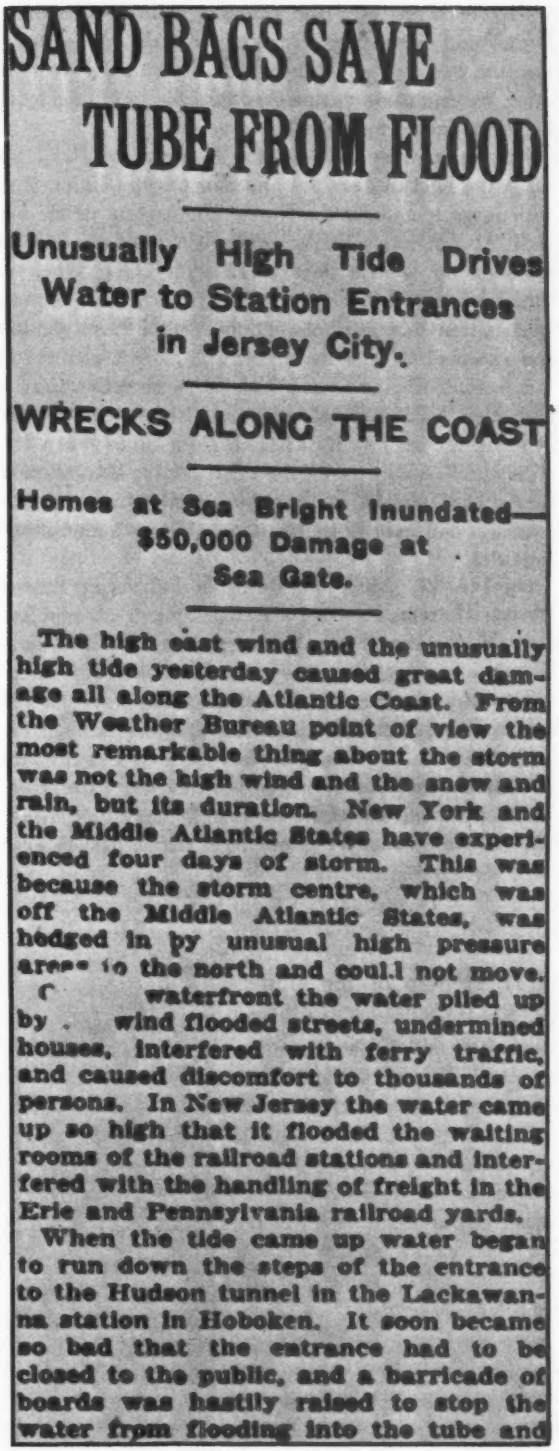
The action of tides is worldwide, originating from the same astronomical positions, but perigean spring tides reach their maximum heights two to four days later on the west coast of Europe than they do in North America. Consequently, the perigean spring tides raised along the west coast of the United States on Jan. 8, 1974 rose on the southwest coast of England on January 11 and 12.

The potential threat of coastal flooding announced in a NOAA press release was published in the British *New Scientist* on Jan. 10, 1974. The unusually high tides coupled with extremely strong onshore winds which prevailed at that time produced severe flood waters in both southwestern England and northern Scotland. More coastal floods occurred in England on Feb. 9-11, 1974, the period of a second predicted perigean spring tide.

Twelve years earlier residents of the mid-Atlantic coastline had no warning of a severe coastal flood about to hit them. On March 6 and 7, 1962, similar astronomical alignments and a combination of perigean spring tides and strong onshore winds created extreme flood waters along the entire mid-Atlantic coastline, killing 40 people, and causing approximately $500 million property damage. Onshore winds lasted for 2½ days through five successive high tides, at an average velocity of 28 to 32 knots. The winds alone could not have caused the extreme flooding that occurred without the unusually high perigean spring tides that accompanied them.

The effects of perigean spring tides can be beneficial as well as detrimental, depending on which side of the fence you are on.

One coastal flood prior to the Civil War affected nautical history by changing geography. On Sept. 8, 1846 perigean spring tides combined with strong onshore winds in the Cape Hatteras, N.C. area causing flood



SAND BAGS SAVE TUBE FROM FLOOD

Unusually High Tide Drives Water to Station Entrances in Jersey City.

WRECKS ALONG THE COAST

Homes at Sea Bright Inundated—$50,000 Damage at Sea Gate.

The high east wind and the unusually high tide yesterday caused great damage all along the Atlantic Coast. From the Weather Bureau point of view the most remarkable thing about the storm was not the high wind and the snow and rain, but its duration. New York and the Middle Atlantic States have experienced four days of storm. This was because the storm centre, which was off the Middle Atlantic States, was hedged in by unusual high pressure areas to the north and could not move.

[illegible] waterfront the water piled up by [illegible] wind flooded streets, undermined houses, interfered with ferry traffic, and caused discomfort to thousands of persons. In New Jersey the water came up so high that it flooded the waiting rooms of the railroad stations and interfered with the handling of freight in the Erie and Pennsylvania railroad yards.

When the tide came up water began to run down the steps of the entrance to the Hudson tunnel in the Lackawanna station in Hoboken. It soon became so bad that the entrance had to be closed to the public, and a barricade of boards was hastily raised to stop the water from flooding into the tube and

New York Times headline credits flood to tide alone.

waters to surge over the Hatteras spit, flood Pamlico Sound and wash back, breaking through the spit and creating the Hatteras Inlet. The following October another coastal storm further scoured the new inlet, making it navigable for oceangoing vessels.

By the summer of 1861 the Confederate Navy was using the inlet to dash out and nab passing Union ships with cargo bound for the North. The captain of the brig B. T. Martin was captured by the Confederates and imprisoned for several days at Hatteras Inlet. When released, he made a full report on activities around Hatteras Inlet. Given this information, the Union Navy planned and executed its first major naval offensive of the war.

A combined Army-Navy task force landed troops on the beach. Taking advantage of the new inlet, the Navy deployed the shallow-draft Monticello to attack Forts Hatteras and Clark guarding the inlet. During this offensive they gained control of Pamlico Sound which the Confederates had used in highly successful blockade-running activities.

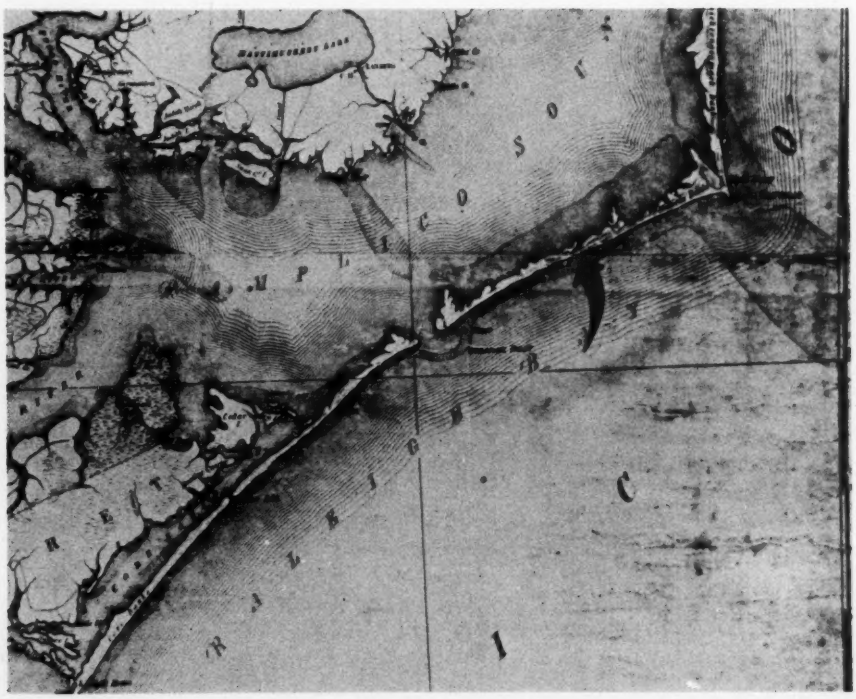
On Jan. 22, 1862, the Burnside Expedition entered the new Hatteras Inlet for a second time. This important stage of the expedition led to the Battle of Roanoke Island.

The days of expecting the unexpected are over, thanks to Wood's research. Wood has explained his findings in a book that goes to press this year. Entitled *The Strategic Role of Perigean Spring Tides in Nautical History and North American Coastal Flooding, 1635-1975,* the book will contain detailed descriptions of the events described here, and other historical incidents affected by perigean spring tides. It will also list dates of past and future occurrences of these tides, the detailed basis for the new theory, a comprehensive analysis of the astronomical oceanographic, and meteorological factors associated with severe coastal flooding, and the effects of these tides on the economy.

Advance information on coastal floods is important to everyone concerned with coastal navigation, small craft, or beachfront property.

Wood eventually hopes to provide information on the potential flooding aspects of perigean spring tides, which he calls "the setup condition," to Civil Defense, Coast Guard, marine weather officials, and the public. Given these setup dates, weather forecasters can predict two to three days in advance whether or not strong onshore winds are likely to coincide with perigean spring tides. If so, they can issue appropriate warnings. The knowledge of perigean spring tide dates alone can be helpful, since unusually high perigean spring tides are accompanied by unusually low tides in the low phase of the tide, making deep draft ships vulnerable to grounding.

Wood has studied more than 100 cases of coastal flooding extending over 340 years of American history. This unique research correlates astronomical, oceanographic and meteorological data to help identify the cause of severe coastal flooding. The practical aspects of Wood's discovery, however, lie in new-found capability to predict future tidal floods, and to limit loss of life and property. ⚓



An 1833 map of the Outer Banks, N.C. before Hatteras Inlet was breached in 1846.
—Courtesy, Library of Congress

The 'Uncommon Carrier'

By Robert Browning

Since World War II, American civilian and military efforts overseas and at home have called repeatedly on the American tugboat industry for its assistance.

One of the leaders among those responding from the Pacific Coast has been PAC, the "uncommon carrier," a group of operating companies offering total capability in river, coastal and deep-sea work anywhere, anytime. The initials stand for Pacific-Alaska-Columbia, areas long served by the PAC group although PAC stands ready to work from the Arctic to the Antarctic and around the 360 degrees of the globe.

The streamed American Indian head insignia of PAC is known in ports around the world and identifies every tug and every barge the company operates.

PAC consists of the Pacific Inland Navigation Co., that name indicating the major work of the company before the post-World War II years propelled it into worldwide operation; Alaska Barge and Transport, Inc. whose equipment and men first took the familiar Indian head overseas; B&R Tug and Barge, Inc. of Kotzebue and Nome, and Seapac, Inc., a Panamanian offshore company.

PAC's president and chief executive officer is Lewis H. Johnson. Corporate headquarters is in Seattle, Wash. From there Johnson directs continuing activities in Alaska; along the Columbia, Snake and Willamette rivers of the Pacific Northwest; a diminished but still ongoing effort in Southeast Asia, and a worldwide ocean towing operation unrelated to its other commitments.

For almost 20 years, PAC has maintained a relationship with the United States Government, first in Alaska, then from 1966 in Indochina where its unique capabilities have been well employed by the military.

It is in these two areas, far apart, totally distinct in climate, terrain and population, that PAC has made itself well-known to the armed forces, particularly to the Military Sealift Command.

In Alaska, PAC, operating in a joint venture, has carried out the annual DEW-line resupply mission since 1957. It was this rugged and successful effort that so well prepared PAC for its later and more massive effort in Indochina.

That effort began in 1966 when PAC, operating as Alaska Barge and Transport, moved into South Vietnam under contract with MSC to provide freight services that the military desperately needed but could not efficiently undertake for itself because of a lack of conventional shoreside cargo handling facilities along most of the coast.

Here, Alaska Barge and Transport, making do with what was at hand and scrounging for what wasn't handy, established an over-the-beach cargo operation that for volume, some 9 million tons, has probably never been surpassed by any civilian effort anywhere.

PAC added something that freight haulers of World War II did not offer. In those days, the mariners dumped their cargoes on the beaches and departed. In South Vietnam, PAC gave its customer, Military Sealift Command, what might be called portal to portal cargo movement, one-carrier transport of cargo of whatever nature from point of origin to destination, on the beach or away from it.

It was this capability that Alaska Barge had developed in Alaska, through necessity, and it is a service the company still offers there and elsewhere. This total effort did not come about during the first months of the company's involvement in Indochina but in less than a year it was a reality.

Much of the cargo handling took place under extreme conditions, the most extreme being enemy fire. Two officers of the tug Michael were killed by a Viet Cong rocket during a convoy run up the Mekong River on April 7, 1968. The more common hazards of storm, heat and disease were faced with comparative equanimity by PAC's men.

The principles PAC used in its work in Southeast Asia were derived, of course, from those established during World War II. From its experiences then, the military knew what it must accomplish. The men from the civilian world of tugboating and merchant shipping carried out the required missions.

This was the case with PAC's first movement into Southeast Asia in January 1966. Officers and men manning an unlikely assemblage of 21 tugs and 33 barges sailed under orders that were general rather than specific. They were told what they must do but they were not told precisely how to do it. But the job was done, after some initial groping, and it was done very well.

A beachhead in Alaska, aside from the absence of enemy fire, does not differ materially from a beachhead in South Vietnam. PAC's men put to work there the skills their leaders had long ago acquired and, in time, moved cargo in volumes that probably had been hoped for but not expected by MSC.

PAC conducted normal harbor operations in Saigon, for example—or operations as near normal as they could be in that overcrowded facility. But the open beach or the shallow bight where weather had always to be reck-

oned with was where most of the work was done.

The mainstay of the PAC fleet in Vietnam was a World War II tug, a 1,200 horsepower vessel measuring 117 feet by 28 feet. The Mikis had a normal operating range of about 2,500 miles and performed satisfactorily although their age made it hard to get spare parts, usually when they were most sorely needed.

Crewmen of the Miki tugs working the convoys along the Mekong quickly learned the old wood hulls, still solid after many years, had a distinct virtue. They contained flying shrapnel, rifle and machine gun fire better than steel. In steel, the deadly metal ricocheted. The wood hull of the Mikis absorbed it.

The tugs and a fleet of 1,500-2,000-deadweight-ton (DWT) barges modified for ramps took their cargoes wherever ordered. But the PAC fleet did not get home free. In South Vietnam the company lost 11 tugs and barges to enemy action.

At its peak in South Vietnam, PAC had 220 Americans and other Caucasians in its force as well as 1,200 Asians, stationed from Hong Kong to Singapore with the majority obviously in Vietnam.

Today, aside from its miniscule Vietnam force, PAC employs more than 1,000 persons in posts ranging from the Arctic coast of Alaska to Hong Kong and Singapore. These people man 55 tugs, 75 barges and the shore bases that must be maintained to support this fleet.

Editor's Note: Seapac's small force in Vietnam was called on to do a big job when the Defense Attache's office in Saigon asked MSC to help with the evacuation of DaNang on March 24. Five tugs, the Saigon 240, Pawnee, Shibaura, Asiatic Stamina and Chitose Maru towing seven barges sailed immediately from Saigon for DaNang. All assets are managed for MSC by Seapac.

When the tugs reached the beleaguered city, the populace was in panic. Head of AB&T's Vietnam operations, Roland Schamberger, wired PAC president Lewis Johnson on March 28:

"All our personnel evacuated from DaNang city, 8:45 a.m. today by order of U.S. Embassy. All property destroyed or abandoned in place. Seapac personnel continue to function as Navy Military Sealift Command representatives, coordinating all vessel activities involved with refugee evacuation. One tug will continue to be used as command center for our staff and U.S. Embassy personnel.

"Tugs and barges encountering difficult conditions in DaNang harbor as thousands attempting to board barges and ships from sampans and other craft. The city is in complete chaos.

"Embassy reports DaNang crowd control impossible. Therefore canceled all attempts of air evacuation. This leaves only sea evacuation for more than a half million persons. We must remain involved as long as possible to evacuate as many as we can."

Schamberger's report was ominous. The relatively small 100-foot tugs ferried thousands of refugees from the panic-stricken city to ships waiting outside the harbor. Some refugees aboard the ill-equipped barges were without food or water for three or four days before ships were available to take them the 300 miles south to Cam Ranh Bay. The Chitose Maru moved 600 refugees on the small tug and towed another 2,000 in the 200-foot-long-by-50-foot-wide barge from DaNang to Cam Ranh Bay, stopping at Nha Trang to secure water for the refugees.

By April 8, PAC had committed 7 tugs and 14 barges to the evacuation as the men of Seapac risked their own lives to save thousands of others.

The Southeast Asia operation must be accounted the most spectacular effort in PAC's comparatively brief history (the first of its companies, Inland Navigation Co., was formed only in 1933) but the end of that far-away adventure seems to be in sight.

A longer enduring endeavor and, probably, a more fruitful one, has been PAC's affair with Alaska, an affair that involves a single military relationship, such as the one in Indochina, and two others that are just as much civilian.

The first of these is the DEW-line supply. The others are supply to the oil fields of Prudhoe Bay, and freight services to civilian populations along the northwest coast of the Bering Sea and into the area's major rivers.

One of PAC's newest river tugs, Kavik, built for use in Alaska, prepares to get under way near Tacoma.

Alaska Barge and Transport, Inc. was formed in 1956 to serve certain areas of Western Alaska solely as a civilian supplier of cargo handling services. But it took less than a year for Alaska Barge to involve itself with the federal government. In those days, before Alaska statehood, the United States Government ran everything in Alaska. The state now controls its destiny, but the federal government is still its major tenant and it is the federal government that maintains such defensive warning systems as the DEW-line and White Alice sites. Federal agencies minister to everything from Alaska's natives to its wildlife.

Scores of government installations must be well-maintained. Some are almost as distant as the moon in terms of accessibility. Most can be reached by air. But, resupply by light aircraft that must use air strips often less than 1,000 feet long is not a practical matter unless there is absolutely no other way to do the job. The majority of these stations can be reached by sea—DEW-line, White Alice, some Navy and Air Force installations, and the other federal agencies that do a job in the wilderness.

Alaska Barge and Transport became a part of this annual effort during the ice-free season of 1957. In 1975, as it has during the previous years, PAC was getting ready once again to do the job that is quite familiar but harder in most ways than the job it was handed in Southeast Asia. This is the cargo movement known as Operation Cool Barge, a joint venture by PAC with Crowley Maritime, Inc., formally known as Alaska Puget United Transportation Co. and usually referred to by the acronym APUTCO.

This year, delivery of more than 100,000 tons of cargo was planned for 62 installations. A handful, slated to receive the first supplies, lie in southeastern and central Alaska.

But most of these points of delivery are in a rougher part of this upper third of the world, from end-of-the-line Attu Island, the last stop west in the far-flung Aleutians, to Barter Island east of Prudhoe Bay, deep into the Arctic, almost to Canada's western frontier. In between lie the Bering Sea and its barren coasts as well as a 460-mile penetration of the Kuskokwim River which, in its own way, has as many surprises for the vessel handler as the Mekong.

Operation Cool Barge is a test of men and equipment more demanding physically than the operation in Indochina. There is no enemy fire along the beaches but weather and terrain are so inhospitable that they at times make Vietnam appear rather inviting.

It is in this area that PAC must be rated at its best. Its vessels are especially designed for the conditions, powerful ocean tugs of comparatively shallow draft, with barges self-contained to the point they lack only propulsion power.

A class-tug is the MV Blackhawk, one of three sisters, rated at 3,300 horsepower and 122 feet with a 34-foot beam. This class has cruise capability of about 5,500 miles. All PAC tugs bear tribal names—from Apache through Yakima. (For those who may not recognize the latter name, it comes from a tribe of American Indians which once occupied much of central and eastern Washington and gave more than the ordinary amount of trouble to white encroachers into their land.)

As for barges, PAC's barge 570 exemplifies the post-World War II movement by the tugboat industry into use of highly specialized equipment, capable despite the

Built of aluminum to stay within the weight limits of the cranes that handle her aboard piggyback barges, the lighter-tug Koyuk is taken for a trial run.

specialization of shifting from one trade to another as demand dictates.

Barge 570 was built primarily for Arctic supply but that does not mean she cannot be moved anywhere in the world where she might be useful. She is 324 feet by 74 feet with a 16½-foot draft, not as shallow as might be preferable for the conditions under which she works, but a depth consistent with her size and her 8,800 DWT capacity.

She is self-sustaining, of a combination tank and hatch design, and has 160,000 cubic feet of below-deck cargo space as well as room for 2,221,000 gallons of bulk fuel, one of the more necessary items she delivers to the northland. She mounts two 60-ton cranes and carries her own lighters, a necessity for her job in the shallow waters of the coastal Bering Sea.

One of her lighters is called Koyuk, after a village of 122 persons east of Nome. Koyuk is built of aluminum to keep her weight within the capacity of the cranes. She has triple screws, a bow ramp and piggybacks two trucks to fulfill the PAC credo of portal to portal cargo delivery.

Some deliveries may take the trucks miles from the landing point over roads that are roads in name only most of the time. Both barge 570 and Koyuk carry 4-inch float hoses for pumping ashore petroleum products at landings where neither vessel can get close enough to pump out directly.

The best vessels and gear in the world of course are no good without men of corresponding caliber to handle and care for them. Over the years, PAC officers and crewmen and other personnel involved in the actual work of the landings have built up skills probably not equalled by many other teams working marine operations anywhere in the world.

Nor can the best of men do much with the best of vessels and gear, if that gear and those vessels do not function when needed. Maintenance of gear used in this Arctic work consumes most of the off-season at PAC's ocean terminal in Tacoma, Wash.

While Operation Cool Barge is under way each year, PAC is getting deep into another Arctic supply mission, the servicing under civilian contract of the oil company consortium preparing to work the Prudhoe Bay fields. This is another joint venture, again with Crowley Maritime, this one operating as Arctic Marine Freighters. PAC and AMF are among the major suppliers to the oil interests. Each year since the discovery strike in 1968, AMF has delivered most of the 200,000 or so tons of supplies the oil people need, not counting pipe for the Alaska pipeline itself.

Every problem encountered in Operation Cool Barge in the Bering Sea exists in spades east of Point Barrow with the ice the gauge by which every movement must be judged. The waters east of Point Barrow usually are not open for navigation (except for icebreakers) before late July or early August and the entire ice-free season amounts to about six weeks at most. (In the northern reaches of the Bering Sea where PAC works, there are only about 100 days free of pack ice.)

This means that time is as important as the ice. The convoys must be in position and ready to move when the wind pushes the ice offshore. It means too that the most speed, consistent with prudent shiphandling, must be made toward Prudhoe Bay through the ever-present drift ice. And it means that 'round the clock is a normal day's work when off-loading begins.

Again, good men, good equipment and a touch of good luck mean the difference between success and failure—and a profit or loss.

As part of its Prudhoe Bay supply, PAC undertook by itself in 1969 what would have been a major new business in the eyes of many men, including some in tugboating. In the Orient, PAC's subsidiary built four 12,500 DWT barges to haul pipe for the Alaska oil delivery line from Japan to Prudhoe Bay. Those barges are 336 by 98 feet. Each carries 12,500 tons of 48-inch-by-55-foot pipe. On the initial haul in 1970, the 3,000 horsepower tugs Apache and Seminole, moving up from South Vietnam, made the haul with tandem tows from Japan to Port Clarence, Alaska in 21 days at a six-knot average.

PAC's other Alaska operation proceeds along a smaller scale but with most of the difficulties of its others. This is the company's effort devoted entirely to supply of the civilian population from Nome north to Point Barrow. This work is handled by the subsidiary B&R Tug and Barge, Inc., based at Kotzebue and at Nome.

From these points, B&R runs a seasonal freight service to about 40 communities along the coast and up such rivers as the Kobuk, the Noatak and the Selawik (community is the only name for most of these points because some are scarcely big enough to be called village). But size aside, they must be serviced with food and fuel and all the other materials they need. Otherwise the people could hardly last through the brutal winter because many have forgotten once common survival skills.

Here however, PAC makes good use of the new skills of the Eskimos. The natives make up about 98 per cent of the summer work force with seasoned Eskimo skippers on the river boats. On the rivers, the native skippers and their crewmen make out well because of their knowledge of the channels of these muddy, tricky arteries of commerce.

The work is as arduous as the beachheads outside. The bargemen must make their own landing sites so ramps can be put down to let the piggyback trucks and forklifts haul their loads where they are intended—again portal to portal delivery.

Kotzebue—where craft such as barge 570 must lie 15 miles offshore to lighter her loads—has a permanent

population of about 1,700, almost entirely Eskimo. A tourist visiting Kotzebue can loiter on the drab main street under a Colonel Sanders Kentucky fried chicken sign while a few yards away salmon dry on the racks as they have for thousands of years. In the background stands B&R's tank farm. The fried chicken sign and the tank farm point the way to the future of the Eskimos.

Far to the south in the Lower 48 lies the heart of PAC's original endeavors, the trade of the Columbia and Snake rivers. Here, operations are massive along a river system well supported by port facilities, with equipment built and worked to match. Here are none of the hazards of the Vietnam coast, the Bering Sea or the Arctic. Even the Columbia and Snake in flood are not much of a threat any more. The series of dams that began with Grand Coulee and Bonneville in the 1930s have tamed most of the rivers.

In 1974, with completion of Lower Granite Dam and locks on the Snake River, the lower reaches of the stream were tamed too and PAC river rigs finally could make their way into Idaho, just across the state line to the Lewiston to tap the rich lands of that area.

This river work is done by PAC's Pacific Inland Navigation Co., river runners who for the first time brought a completely integrated system to the Columbia, one of the great rivers of the continent and one with a history as turbulent, on its own scale, as that of the Mississippi.

The Columbia-Snake system is the major outlet for the grain, chiefly wheat, grown in the Pacific Northwest east of the Cascade Mountains and west of the Rockies, a vast and fertile area where a major part of the Pacific Coast's growing export business in grain has its origin. For this trade, PAC has equipment as specialized as any of its Arctic gear.

The boats range from 1,000 to 4,000 horsepower and some have ocean capability. All are distinguishable by the high wheelhouse and pusher gear. On the Columbia and the Snake, as on most of the rivers of the world, barges are pushed rather than towed.

PAC's river barges are smaller than most of its ocean barges, running from 1,000 to 3,000 DWT capacity. Some have hoppers for grain and cement and are tanked for bulk petroleum. Some are insulated for cargoes such as heavy oils or molasses, substances sensitive to temperature extremes. Too hot in summer, too cold in winter —a considerable part of the population uses those terms to describe the inland empire area where PAC works along the rivers.

Although most of the perils of coastal and deep sea work are not found on the Columbia and its tributaries (PAC works part of Oregon's Willamette River too and has its river operations headquarters at Portland) the movement of tugs and multiple units of barges along the rivers is a high art.

Sudden furious winds like the williwaws of the Aleutians are common the year around on the rivers. The locks of the drams that must be transited from Bonneville, lowest on the Columbia, to Lower Granite, well up the Snake, also demand the best of seamanship. The locks raise and lower the rigs the equivalent of the height of an eight-story building. Except for Bonneville, all locks are 86 feet wide. Shoehorning a combo of four barges, each 250 feet long and 42 feet wide through the turbulence of the approach to the lock chamber is not a skill quickly or easily learned.

With its efficient river equipment, PAC hauls its massive tonnages of grain down-river. Upriver, the company freights great quantities of petroleum products. Most of this oil and gasoline goes to the 16.25 million gallon tank farm at Pasco, Wash. From there, it is distributed through the rich Tri-Cities area of Washington—Pasco, Kennewick, Richland.

Richland was the headquarters for the super secret Manhattan Project of World War II that produced the first nuclear bombs on the adjoining Hanford Reservation. The city, along with Pasco and Kennewick, is growing because of the coming of water from the Columbia River to previously arid land. The tri-cities area will become even more important to PAC's growth on the Columbia than it is now.

While PAC works away at its Arctic supply missions, its river operation and its coastal services, always, somewhere on the world's seas, PAC tugs are under way on long hauls to ports most Americans may never have heard of.

With its deep-sea capability, PAC can tow any vessel or combination of vessels anywhere that anyone needs its services. In 1961 when the company was first beginning to flex its muscles, it began towing Liberty ships in tandem to the ship breakers in Japan. With that experience to build on, offshore towing has become a major endeavor of PAC—witness that first flotilla it sent so successfully from the West Coast early in 1966 into an uncertain and hazardous situation in Vietnam.

PAC calls itself the "can do" company. Time after time, it has proven it can do the job. Anywhere, anytime, anyhow!

A former newspaper man, now a free-lance writer, Robert Browning lives in Edmonds, Wash. and has specialized in maritime and fisheries subjects of the Pacific Northwest for more than 28 years.

He is the author of **Fisheries of the North Pacific** published in April, 1974.

Armed with rifles, U.S. Marines search SS Mayaguez for Cambodian soldiers. See story page 4.

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